

EXAMINING PRODUCTIVE ASSETS AND PRODUCTIVITY GAPS BETWEEN MALE AND FEMALE SMALLHOLDER RICE FARMERS IN BENUE STATE, NIGERIA

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Abstract

This study examined the gender disparities in access to productive assets and their impact on the productivity of smallholder rice farmers in Benue State, Nigeria. Utilizing a sample of 269 rice farmers, randomly selected from six Local Government Areas (LGAs) in Benue State, data were collected through structured questionnaires and analyzed using descriptive statistics and independent sample t-test. The findings revealed significant gender disparities in access to key productive assets, including agricultural credit, improved rice varieties, and mechanization tools, with male farmers having greater access compared to their female counterparts. These disparities contribute to substantial productivity differentials, with male farmers demonstrating significantly higher productivity levels (mean of 10,031,961.33 kg) compared to female farmers (mean of 922,662.30 kg). The t-test results further confirm the statistical significance of these differences ($p < 0.05$). The study underscores the need for targeted interventions to enhance female farmers' access to productive resources and improve their agricultural productivity, and recommended that rice farmers who women should come together to form cooperative societies as this will help to pool resources, increase bargaining power, provide access to collective credit facilities, and facilitate bulk purchasing of inputs like seeds and fertilizers; women rice farmers should engage in advocacy to influence State and Local Government policies that promote gender equality in access to agricultural resources; women rice farmers could also collaborate with NGOs and development agencies that focus on women's empowerment in agriculture.

Keywords: Gender Differentials; Productive Assets; Productivity; Smallholder; Rice Farmers; Benue State; Nigeria

Introduction

The participation of women in agricultural production significantly contribute to the global food security (Glazebrook *et al.*, 2020). Their commitment to the agricultural work force is revealed to be higher than that from men (Anderson *et al.*, 2021; Glazebrook *et al.*, 2020). In Nigeria, women play a vital role in food and agriculture. It is estimated that women constitute about 60-80% of agricultural labour force in Nigeria and they produce two-third of the food crops consumed in the country (Jeiyol *et al.*, 2013).

In spite of the important contribution of smallholder female farmers in the agricultural sector of the country, they have limited access to land, credit facilities, farm inputs, training and advice, and technology. Also, very few of them have holding rights on the land where they farm in Nigeria, with many working in the fields unpaid and little say on how earnings are spent. According to Ibitomi (2023), greater percentage of women cooperative

societies under the smallholder farmers' organization in Nigeria do not have access to agricultural inputs to enable them to scale up their production. Confirmed by 81% of smallholder women farmers, Ibitomi (2023) revealed that these women cooperatives have not received agricultural inputs from the government in the past 4 years.

A 2012 gender policy report by the Federal Ministry of Agriculture and Rural Development showed that in rural Nigeria, only 8.5 percent of the women own land compared to 38.1 percent men. In the relatively poor rural areas, 10.1 percent of women have access to land against 46.1 percent men. In urban centres, 4.5 percent of the women have access to land while 49.5 percent of men own land. Amongst the urban poor population, 5.9 percent of the women have land compared to 28 percent of their male counterparts (Udegbuma, 2021).

Jeiyol *et al.* (2013) revealed that this men and women differential access to resources results from socially emanated gender-specific constraints that are built into the socio-economic, local institutions and socio-cultural norms and practices in their domain. According to Raney *et al.* (2011), gender differences arise from socially constructed relationship between men and women. These differences according to Raney *et al.* (2011) affect the distribution of resources and responsibilities between men and women, and are shaped by ideological, religious, ethnic, economic, and cultural determinants.

The effect of this gender disparity in the access to farm inputs is that the productivity of the women farmers is being negatively affected. Numerous studies within the African continent have also substantiated the fact that the gender gap in resource acquisition reduced the efficiency of agricultural production. The African Development Bank, AFDB, (2014) revealed that women's productivity is 30 percent lower than that of the men because women lack access to relevant production inputs. Similarly, Coker *et al.* (2017) showed that productivity differential between men and women averages around 20-30 percent and attributed this to differences in resource use.

In an effort to boost productivity of smallholder female rice farmers and hence rice production in Nigeria, a deliberate policy needs to be put in place to address the disparity between male and female farmers in their acquisition of farm resources. Coker *et al.* (2017) reported that bringing yields on the land farmed by women up to the levels achieved by men would increase agricultural production in developing countries between 2.5 and 4 percent and reduce the number of under nourished people globally by 12-17 percent. World Bank (2012) further affirmed that ensuring gender parity with respect to agro-inputs would enhance yield by 11-16 percent in Malawi and by 17 percent in Ghana. The report by World Bank (2012) also revealed that increasing women property rights in Burkina Faso through resource allocation from men to women would raise household agricultural production by 6 percent.

There are several related studies on gender differential in productive asset acquisition among smallholder farmers in Nigeria. These include but not limited to Enwelu *et al.* (2014) that studied women farmers' access and use of land for agriculture in selected communities of Anambra State, Nigeria; Ajuwon *et al.* (2021) that analysed gender

access to farm inputs among small scale crop farmers in the North Central Zone of Nigeria; and Oladosu *et al.* (2018) that investigated gender differentials in the accessibility of agricultural production in resources among yam farmers in Oyo state, Nigeria. However, none of these studies looked at the productive assets and productivity differentials among male and female smallholder rice farmers in Benue state, Nigeria. Thus, this study was designed to bridge this research gap. The specific objectives were to examine the productive assets available and accessible to male and female smallholder rice farmers; and compare the productivity of male and female smallholder rice farmers.

Methodology The Study Area

The study was conducted in Benue State, Nigeria. The State is located in the North Central region of Nigeria and lies between Latitudes 6°25' and 8°8'N and Longitudes 7°47'E and 16°E (Susan and Nirupana, 2015). The State has a total land area of about 33,955 square kilometers with a population of 4,253,641 (National Population Commission (NPC), 2006), with an average population density of 99 persons per square kilometers. The projected population of the State in 2022 was 6,141,300 (Brinkhoff, 2022).

Benue is rich in agriculture and grows crops such as rice sweet potatoes, cassava, soya bean, guinea corn, yams sesame, and groundnuts. Also, the rearing of livestock such as pig, cattle, goat, sheep and fish abound in the State.

Population of the Study

The population of the study comprised 821 registered rice farmers from Kwande, Logo, Makurdi, Guma, Apa, and Oju LGAs of Benue State, Nigeria, obtained in 2018 from the Benue State chapter of Rice Farmers Association of Nigeria (RIFAN).

Sampling Technique and Data Collection

The study utilized random sampling technique to select a sample of 269 rice farmers from six randomly selected LGAs in Benue State. Data collection was carried out using structured questionnaire.

Analytical Techniques

The study utilized descriptive statistics and independent sample t-test, to analyze the collected data. Descriptive statistics were used to analyze the productive assets available and accessible to male and female smallholder rice farmers, while the independent sample t-test was used to analyze the differences in the productivity of male and female rice farmers.

Results and Discussion

Productive assets available and accessible to male and female smallholder rice farmers Table 1, illustrates a gender disparity in access to agricultural credit among smallholder rice farmers in Benue state, Nigeria. While a majority of male farmers (52.66%) had access to agricultural credit, a significantly lower percentage of female farmers (37.10%) had the same access. This discrepancy suggests that women farmers face greater challenges in

accessing financial resources critical for enhancing their productivity and livelihoods. The findings underscore the importance of addressing gender inequalities in accessing productive assets. Policies and programs should be implemented to promote equal access to credit, which could lead to improved agricultural productivity, income generation, and ultimately, gender equality in the agricultural sector.

The result indicate that a higher percentage of male farmers had access to improved rice varieties compared to female farmers (88.49% vs. 52.05%). This discrepancy indicates that female farmers may face barriers in acquiring or utilizing improved agricultural inputs, which could hinder their productivity and income potential. Also, regarding hired labour, while a substantial number of male farmers had access to hired labour (77.59%), a slightly higher percentage of female farmers also had this access (67.32%). This suggests that female farmers may rely more on hired labour for farm activities, possibly due to a lack of access to other productive assets or constraints on their time and labour. These finding is in line with those of Oladosu *et al.* (2018) who investigated gender differentials in the accessibility of agricultural production resources among yam farmers in Saki agricultural zone of Oyo state, Nigeria. These findings have important implications for policy and interventions aimed at promoting gender equality and enhancing agricultural productivity among smallholder rice farmers. Efforts should be made to increase female farmers' access to improved rice varieties, possibly through targeted extension services, training programs, or subsidies. Additionally, enhancing access to other productive assets, such as machinery or irrigation, could further empower female farmers and contribute to overall agricultural development in the region. Addressing these disparities is crucial for achieving sustainable and inclusive agricultural growth in Benue state.

The result equally reveals stark disparity in the access to key productive assets between male and female smallholder rice farmers in Benue state, Nigeria. It shows that with the 198 sample of male farmers, 95.96% of them had access to farm land compared to 15.49% of the sampled 71 female farmers. This disparity underscores the unequal distribution of land ownership and access, which is crucial for agricultural productivity and livelihoods. These findings tallies with those of Jamaludheen *et al.* (2022) who investigated the composition and determinants of farmers' investment on productive assets in rural India. Female farmers' limited access to land could hinder their ability to engage in profitable agricultural activities and contribute to food security. In terms of Information and Communication Technology (ICT) access, the data indicates that a higher percentage of male farmers had access to ICT compared to female farmers (82.47%) as compared to the low number of their female counterpart who had low access to ICT (9.30%). This gap suggests that female farmers may be at a disadvantage in accessing valuable agricultural information, market prices, and other resources that ICT can provide. This lack of access could impede their ability to make informed decisions and adopt modern farming practices.

The table highlights disparity in access to extension services, with a higher percentage of male farmers (64.52%) having access compared to female farmers (4.35%). Extension services play a critical role in disseminating agricultural information, providing training, and improving farmers' skills. This findings was contradicted by that of Ajuwon *et al.* (2021) who analyzed gender access to farm inputs among small scale crop farmers in the North Central zone of Nigeria. The low access among female farmers could limit their capacity to adopt new technologies and practices, ultimately affecting their productivity and income. Addressing these disparities by promoting gender-inclusive policies and programs could enhance the productivity and livelihoods of female rice farmers in Benue state.

The table illustrates stark gender disparity in the access to crucial productive assets among smallholder rice farmers in Benue state, Nigeria. Regarding access to tractors, a significantly higher percentage of male farmers had access (67.35%) compared to female farmers with little access (18.03%). This discrepancy suggests that male farmers are more likely to benefit from mechanization, which can lead to increased efficiency and productivity, potentially widening the productivity gap between male and female farmers. In terms of agricultural training, the data indicates that a higher percentage of male farmers (77.45%) had access compared to female farmers (16.17%). This disparity implies that male farmers are more likely to be equipped with modern farming techniques and knowledge, enhancing their farming practices and overall productivity. Female farmers, on the other hand, may face challenges in adopting modern agricultural practices due to limited access to training.

With regards to access to storage facilities, the table shows that a higher percentage of female farmers had access (78.89%) compared to their male farmers counterpart (60.89%). While this might seem positive, it could also indicate a lack of access to modern storage facilities among male farmers, which are essential for preserving agricultural produce and reducing post-harvest losses. This highlights the need for improved access to storage facilities for male farmers to enhance their agricultural productivity and reduce food loss. In the same vein, in terms of access to irrigating machines, a significantly higher percentage of female farmers (92.78%) do not have access compared to male farmers (47.67%). This suggests that female farmers are more reliant on manual irrigation methods, which are often less efficient and labour-intensive. Improving access to irrigating machines for female farmers could help increase their productivity and reduce the drudgery of manual labour. On the access to NPK fertilizer, a higher percentage of male farmers (92.11%) had access compared to female farmers (50.63%). This finding is in line with the findings of Olufemi and Adejumo (2020) who investigated gender, productive resources and agricultural development in the urban area. This discrepancy could impact crop yields, as NPK fertilizer is essential for soil fertility and crop growth. Ensuring equal access to inputs like fertilizer is crucial for promoting gender equality in agriculture and improving the overall productivity and livelihoods of smallholder rice farmers in Benue state.

In terms of access to UREA fertilizer, a higher percentage of female farmers (76.27%) had access compared to male farmers (66.89%). This indicates a relatively equitable distribution of this input, which is crucial for enhancing soil fertility and crop yields. However, efforts should be made to ensure that all farmers, regardless of gender, have access to this essential input to optimize agricultural productivity. Regarding access to Touchdown Forte 500EC, Solito 320EC, and Karate 3EC pesticides, the data shows that female farmers have higher access rates than male farmers. This could be attributed to the perceived affordability or availability of these pesticides to female farmers. However, the overreliance on pesticides may raise concerns about environmental sustainability and health risks. Hence, there is a need for sustainable pest management practices and awareness campaigns to mitigate these risks.

Concerning access to knapsack sprayers, a significantly higher percentage of male farmers (81.82%) had access compared to female farmers (61.67%). Knapsack sprayers are essential for applying pesticides and fertilizers efficiently. The lower access among female farmers could indicate challenges in adopting modern farming practices, which may hinder their productivity. Providing training and access to these tools could enhance female farmers' efficiency and productivity. In terms of access to planters, the data shows a significant disparity, with a higher percentage of male farmers (81.25%) having access compared to female farmers (5.82%). Planters are crucial for planting seeds efficiently and timely, which can significantly impact crop yields. Improving access to planters among female farmers could help increase their productivity and reduce labour burdens associated with manual planting methods. Furthermore, regarding access to agricultural information, a higher percentage of male farmers (78.57%) had access compared to female farmers (28.67%). Access to timely and relevant information is essential for making informed decisions about farming practices, market trends, and technology adoption. Improving access to agricultural information among female farmers could enhance their capacity to adopt modern farming practices and improve their overall productivity.

The findings highlight the need for targeted interventions to address the gender disparities in the access to productive assets among smallholder rice farmers in Benue State. Enhancing access to inputs such as fertilizers, pesticides, sprayers, planters, and agricultural information can help improve the productivity and livelihoods of female farmers. Policies and programs that promote gender equality in access to productive assets and provide support for capacity building and technology adoption among female farmers are essential for sustainable agricultural development in Benue state.

Table 1 : Productive Assets Available

Variables	Male		Female	
	Frequency	Percentage	Frequency	Percentage

Agricultural credit					
Available	109	52.66	23	37.10	
Not available	98	47.34	39	62.90	
Improved rice varieties					
Available	99	88.49	76	52.05	
Not available	24	19.51	70	47.95	
Hired labour Available					
	90	77.59	103	67.32	
Not available	26	22.41	50	32.68	
Farm land Available					
	190	95.96	11	15.49	
Not available	8	4.04	60	84.51	
Info Com Tech					
Available	80	82.47	16	9.30	
Not available	17	17.53	156	90.70	
Extension services					
Available	40	64.52	9	4.35	
Not available	22	35.48	198	95	
Tractor					
Available	99	67.35	22	18.03	
Not available	48	32.65	100	81.97	
Agricultural training					
Available	79	77.45	27	16.17	
Not available	23	22.55	140	83.83	
Storage facilities					
Available	109	60.89	71	78.89	
Not available	70	39.11	19	21.11	

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Irrigating machines				
Available	90	52.33	7	7.22
Not available	82	47.67	90	92.78
NPK				
Available	175	92.11	40	50.63
Not available	15	7.89	39	49.37
UREA				
Available	101	66.89	90	76.27
Not available	50	33.11	28	23.73
Touchdown forte 500EC				
Available	87	52.10	64	62.75
Not available	80	47.90	38	37.25
Solito 320EC				
Available	76	53.90	100	78.13
Not available	65	46.10	28	21.88
Karate 3EC				
Available	99	68.75	89	71.20
Not available	45	31.25	36	28.8
Knapsack Sprayer				
Available	171	81.82	37	61.67
Not available	38	18.18	23	38.33
Planter				
Available	65	81.25	11	5.82
Not available	15	18.75	178	94.98
Agricultural information				
Available	99	78.57	41	28.67
Not available	27	21.43	102	71.33

Source: Field Survey, 2023

Difference in productivity among male and female rice farmer

Table 2 presents the group statistics for productivity levels among smallholder rice farmers in Benue State and show a stark difference between male and female farmers. The mean productivity for male farmers (Group 1) is substantially higher at 10031961.33 compared to female farmers (Group 2) with a mean of 922662.30. The standard deviations and standard errors suggest considerable variability within each group, but the large difference in means indicates a significant productivity gap between genders. The finding is in tandem with those of Onubogu (2023) who investigated gender differences in agricultural productivity among rice farmers in Anambra State, Nigeria and found similar result. These findings suggest that male farmers in the study area are generally more productive than their female counterparts. This disparity has implications for gender equality and economic development, highlighting the need for interventions to support female farmers with access to resources, training, and technology to improve their productivity and overall well-being.

Table 3 presents the results of an independent samples t-test comparing the productivity levels between male and female smallholder rice farmers in Benue State, Nigeria. The Levene's test for equality of variances indicates that the assumption of equal variances is not violated ($F = 1.405$, $p = .120$), allowing for the interpretation of the t-test results. The t-test reveals a statistically significant difference in productivity levels between male and female farmers, with a t-value of 2.784 and 267 degrees of freedom ($p = .006$) when assuming equal variances. This significance persists even when equal variances are not assumed, with a higher t-value of 4.973 and 206.767 degrees of freedom ($p = .000$). The mean difference in productivity between male and female farmers is 9109299.03, with a 95% confidence interval ranging from 2666364.26 to 15552233.80. This finding is in accordance with the findings of Olakojo (2017) who assessed gender gap in agricultural productivity across selected major crops grown by Nigeria farmers including cassava, yam, maize, guinea corn, bean and millet.

These findings suggest that there are significant gender disparities in productivity levels among smallholder rice farmers in Benue State. The results imply that male farmers are more productive than female farmers in the study area. Such disparities can have profound implications for the economic empowerment and livelihoods of female farmers, potentially limiting their ability to increase productivity and income. Addressing these disparities would require targeted interventions such as providing female farmers with better access to education, training, and resources, as well as implementing policies that promote gender equality in agricultural practices and decision-making processes.

Table 2: Group Statistics for Objective Four

Gender	n	Mean	Std. Deviation	Std. Error Mean
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Productivity	1.00	205	10031961.3268	26136706.48142	1825466.76383
	2.00	64	922662.2969	1207346.44737	150918.30592

Table 3: Independent Samples Test

for Equality of Variances	Levene's Test		t-test for Equality of Means					
	F	Sig.	t	df	Sig.	Mean	Std.	95% Confidence
								(2- Differe Error Interval of the tailed) nce
								Lower Upper
Equal variances	1.405	.120	2.784	267	.006	910929	327237	266636 155522
Prd assumed utvit			4.97	206	.000	910929	183169	549810 127204
Equal y variances not assumed			3	767		910929	183169	549810 127204
						9.0299	4.6363	6.7160 91.343
						5	7	4 87

Conclusion and Recommendations

This study investigated the gender disparities in access to productive assets and their impact on productivity among smallholder rice farmers in Benue State, Nigeria. The findings revealed significant gender differences in the availability and accessibility of critical agricultural resources, including credit, improved rice varieties, farm land, information and communication technology (ICT), extension services, and mechanization. Male farmers generally had better access to these productive assets compared to their female counterparts, which contributed to a substantial productivity gap between genders.

The study's results highlighted that male farmers were significantly more productive than female farmers, with the mean productivity of male farmers being considerably higher. This productivity disparity underscores the challenges faced by female farmers, who, despite their reliance on hired labor and access to certain resources like storage facilities and pesticides, remain constrained by limited access to key inputs and technologies that are essential for enhancing agricultural productivity.

The findings of this study align with previous research that has documented gender disparities in access to agricultural resources and productivity outcomes in various regions. These disparities have important implications for gender equality, economic development, and food security in Benue State and Nigeria as a whole.

Based on the findings of the study, the following were recommended:

- i. Rice farmers who women should come together to form cooperative societies as this will help to pool resources, increase bargaining power, provide access to collective credit facilities, and facilitate bulk purchasing of inputs like seeds and fertilizers. Overall, this will help them in reducing costs and improving access to these essential productive resources.
- ii. Women rice farmers should engage in advocacy to influence State and Local Government policies that promote gender equality in access to agricultural resources. These policies could include land reforms, easier access to credit for women, and subsidies for inputs like fertilizers and seeds.
- iii. These women rice farmers could also collaborate with NGOs and development agencies that focus on women's empowerment in agriculture as these organizations often provide technical support, access to inputs, and financial assistance targeted specifically at women farmers.

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